

# Engineering the Sound of Frogs

Ronnie Bille

*Danish sound engineer Ronnie Bille has spent the last four years making an audio collection of the eleven native Danish frog species and their croaks. He now realises that it may well take him another four to finish the project.*

## **From rock music to nature recordings**

*In the late 70's Ronnie Bille was a rock guitarist. Music was his first love but the essential proximity of guitar pedals, amplifiers and mixing desks seduced him into the world of engineering and audio. Formal training wasn't available so experience had to be his master. Over a period of fifteen years he worked upwards through PA and studio recording jobs until he found himself in a regional TV station under the auspices of Danish national TV2.*

*Suddenly he found that instead of a multi-channel mixer, racks of outboard gear and dozens of microphones his world had shrunk to a single shotgun microphone in a Rycote and an SQN mixer slung round his neck – the lot of most TV soundmen throughout the world. Even more surprisingly he found he enjoyed it. The essential requirement of learning how to make a single microphone sound good no matter what the sound source was a welcome challenge and delightful in its quasi-religious simplicity.*

*Besides the bread-and-butter of TV news and feature work the last nine years have allowed him the luscious Danish pastry of heavyweight documentary work in Africa, Cambodia and the Caribbean with a cameraman friend. He has also been able to record a range of stereo nature atmospheres and release some to the sole Danish FX archive.*

*Green toad* — Amphi-foto, Kurt Jorgensen



### *Recording frogs*

There are eleven different species of frog in Denmark and I took the decision to record their sounds in high quality stereo to further an understanding of the natural world. By letting schools and communities hear the sounds I believe that they will realise how fantastic nature is and understand how important the preservation of animals and nature is.

Each croak sound is very different – from something like the howling of a dog to the ringing of church bells; from the classic throaty growl to a

whistle or the sound of a rainforest ... an amazing world, most of which proved to be extraordinarily hard to record.

The first one – the edible frog – was quite easy. It has a croak season of a whole month and is active both night and day. It is loud too, so all I had to do was find a moor, a small pond or even a gravel pit away from farms, city sky-line noise and any industrial or traffic noise. Ideally it needed to be a warm day after rain and with no wind. Just a matter of the right location, the right weather and the croak season.

*Edible frog* – Amphi-foto, Kurt Jorgensen



But then came the frogs that are only active at night, and those that only croak under water. And the ones that are only active for one or two weeks in an entire year so you just have to be there even if the weather is atrocious. And if you don't manage to get them that year you have to wait till the next. Meanwhile you can use the time to find a location where that one specific species lives and offer up a prayer that no other species that fancies the same habitat will want to make a noise at the same moment and ruin your once-a-year recording.

You can't actually record while it's raining because of the sound of the raindrops, or when it is too windy because of the noise of rushes, trees and leaves moving. And since two of the species really do only croak when submerged I knew this would be a challenge – and even more so when I found out they are only active at night. That's when I realised I would have to start experimenting with underwater stereo microphones and also moving around in the dark.

The equipment I use is –

- a Neumann RSM 191 MS stereo shotgun microphone with a short Rycote mono-size windshield
- a small K & M mic stand without a boom arm.
- a pair of DPA 4062 personal (lavalier) microphones adapted for underwater recordings.
- an SQN 2S, the new and smaller 2:2 mixer which is brilliant, with lights in the VU`s and only weighs 1,2 kg.
- Sennheiser HD 25 headphones
- an HHB PDR 1000 DAT recorder (without timecode)
- a single 20m length of stereo Mogami cable.

All this equipment packs into a rucksack complete with batteries, DAT-tapes and a notebook, with a total weight of only about 12 kg.



*Equipment-to-go*

It is very important to keep the weight as low as possible and the only heavy thing is the mic-stand: lighter versions give too much handling noise – though this is really “stand” noise. I use my car to drive near to a location, unpack my mountain bike from the back and ride as close as I can, and then end up on foot. On sunny days this is easy, but for the nocturnal frogs it is much harder, and needs the right clothing, some light and a good deal of physical energy.

### **Scared to death**

I almost always go alone. Taking other people creates problems: the obvious ones of talking over recordings but also distraction and loss of concentration. Most of the time the frog sounds are very low level so the input gain is high – the microphone just

hears everything, even my own breathing. For this reason it is impossible to hold the microphone and that’s why I use a stand. I also have to be a good 10m away so that I can at least move a little while waiting for the right moment to record. The frogs are clever and can see and hear you so I wait very quietly listening with just the SQN switched on.

Once I was recording the very first frog croak of the season in March. I was about 1km into the forest, by myself in the middle of the night. I’m not normally scared of darkness but I felt my pulse rate rise just a little as I walked. At the pond I set up the microphone and settled myself 20m’s cable length away with my headphones on waiting for the frogs to sing.

The trouble was that my ears were 20m away from me back by the pond, not where I was sitting – very confusing to the senses. A small twig dropped onto my jacket in the dark without me noticing and when it flicked off again the shock was so great I nearly took up smoking again....

Another time I had to negotiate an electric fence around a cow pasture in order to reach my pond. That didn't worry me too much – I've done it often – but this time I suddenly realised there was also a bull!



*Portadat & SQN 2S*

### **Why using the SQN sound mixer ?**

Obviously the Portadat has a microphone input so why do I use the SQN? Well this sort of recording demands the ultimate in quality and the SQN has a much better mic amp and also 20dB more gain. For “low-level” frogs this is really important. I also need the high pass filters, especially for high gain recording. Cutting off the extreme LF allows you to leave a little less headroom. You can record the other frequencies at higher level and get a better signal-to-noise ratio. For the long hours of waiting it also means that the Portadat doesn't have to be switched on which saves both batteries and head-wear. Besides, I'm besotted with my little 2S, which weighs only half as much as a 4S and still sounds brilliant.

### **The stereo microphone**

Most of the time I use the Neumann RSM191 stereo microphone to “capture” the frogs. It has two capsules – a figure-of-eight and a hypercardioid in the same short shotgun barrel. There is an XLR-7 connector and a long cable back to a matrix box (MTX191), which sits beside my recorder. The box controls the output of the microphone and allows me to select MS – which makes it easier to manipulate the stereo image later in post-production – or XY for a definitive stereo mix. The image width can be adjusted in six 3dB steps by adjusting the S signal relative to the M. The matrix box also has two selectable highpass filters and can run off external phantom or an internal 9V battery.



*Neumann  
RSM191  
In Rycote  
Modular  
suspension  
with wind-  
shield and  
(pristine)  
windjammer*

### The windshield

Outdoor recording of nature sounds requires serious consideration about windshielding. There is no question that the Rycote suspension, windshield and windjammer are the best tools in the world to eradicate unwanted windnoise. And this is what it is most about – making a recording that is as natural as possible, with as much dynamic range and as little noise as possible, and without any sounds which have no business to be there.

I fit the Neumann RSM191 into a Modular 4-point suspension and use a short windshield (for compactness). And I use a windjammer that I take really good care of. That means it stays in its plastic bag

except when I am using it. Before any recording I brush it to get rid of any knotty or matted areas. There should be no rumples. It should look like a field of corn waving in the breeze when you blow on it. If it gets wet or matted it just doesn't work. I frequently change them – my windjammers never get old. This is not something to save money on.

I'm also looking forward to experimenting with a green [frog] coloured windjammer, which Rycote have made especially for me. The standard grey one looks rather predatory and often makes the frogs and birds stay quiet.



*A good pond for  
recording frogs*

**Recording underwater and in stereo ?**

A few experiments with normal microphones soon showed that small omni personal microphones work best. Most are too sensitive to the increased pressure just under the surface of the water but DPA make one - the DPA4062 - which can cope with very high sound pressure level and works under these conditions. By using part of a kitchen egg whisk to make a protective frame and fitting the microphone in the centre with a condom and a little silicone sealant it is possible to make a very good sub-surface microphone. Make another one and put it 30cm away and you have a fine AB stereo setup.



*Half of a sub-surface DPA4062 stereo pair*



*The agile frog which only croaks when submerged - Amphifoto, Kurt Jorgensen*

**MS or XY stereo ?**

High quality sound recordings for use in broadcast must be compatible with mono. MS recordings keep their level and quality throughout a mix whether listened to in stereo or mono. XY recordings often seem to drop a couple of dBs in the final mix if auditioned in

mono. So MS could be said to stay more "true" than XY. On the other hand XY can cover a greater area than MS. I use both techniques depending on the job, but I admit to loving MS stereo for its 3-dimensional psychoacoustic qualities - lots of depth.



*The colourful tree frog – Amphi-foto, Kurt Jorgensen*

**What's next**

I've still got some more frogs to record and meanwhile I am delivering material to the Danish sound archive (DR). It may be a little unusual as an interest but I get the feeling that what I am doing is important as well as pleasurable. It demonstrates what a wonderful world we live in and how we – that's you too – should all take care of it.



*Ronnie Bille*

# Rycote

Frog pictures courtesy of Amphi-foto – Kurt Jorgensen  
Other pictures - Ronnie Bille

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